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Electronic Components

Korea

U.S. DEPARTMENT OF COMMERCE
International Trade Administration

READEX

Korea

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CMS

Korea's electronics industry is in a transition period, changing over from component manufacturing to the production of component-intensive items. The industry is vital to the national economy, accounting for over 9 percent of GNP in 1984, and is a mainstay of the country's exports. Output, which advanced at 36 percent annually from 1970 to 1983, topped the $7 billion mark in 1984. Government policy actively encourages the industry, calling for new plant formation, modernization and expansion of existing production facilities, and increased R&D outlays. The 1982-86 Economic and Social Development Plan seeks to enhance the international competitiveness of the electronics industry by altering its emphasis from consumer products to high-tech industrial goods.

The growth of the electronics industry is spurring sales of electronic components, with turnover projected to climb 25 percent yearly to almost $4 billion in 1988 (see table 1 and figure 1). Enormous annual sales increases are expected for a number of components, including magnetics; filters, networks, and crystals; capacitors; and electron tubes (see table 2).

The growing demand for sophisticated electronic components is expected to create a good market for advanced, specialized U.S.-made devices, particularly those high-tech components for which insufficient local demand exists to justify domestic manufacture. A recent survey by the Electronic Industries Association of Korea showed the need for imports in six major categories:

- For color TV sets—Tantalum capacitors, saw filters, monolithic IC's, TR (2SC 1984), and 5" color electron tubes
- For video tape recorders—RF converters, relays, trimmer capacitors, tape counters, video head assemblies, and DC motors
- For microwave ovens—Triac, fused (buss ceramic tubes), JC type relays, high-voltage diodes, IC's
- For computers and peripherals—hard disk drives, 3" EDD, color display monitors, switching power supply (MC), multi PCB's, capacitor type keyboards, magnetic heads, step motors, IC sockets, and connectors
- For cassette recorders—microcapacitors, headphone jacks, tape counters, IC's and ceramic filters
- For car stereo sets—tact push switches, tuners, variable resistors, notch filter trimmer capacitors, and IC's

End Users

The home entertainment products, computers, and communications equipment industries purchase 85 percent of all electronic components sold in Korea (see table 3 and figure 2). The Fifth Five-Year Plan is pushing all three industries to move to higher technology levels and to substitute local production for imported goods. Government policy seeks to lessen the concentration of economic power now in the hands of conglomerates and to bolster medium-sized and small companies. Exports of consumer products are strongly pushed, industrial equipment makers are urged to increase production levels to meet growing local demand, and the communications industry is pushed to use modern broadcasting and telecommunications techniques.

In the electronic industries' bid to raise technology levels, R&D expenses were raised from 1.4 percent of turnover in 1980 to 2.4 percent in 1982; they jumped to as high as 4 percent in 1983 for Gold Star, Samsung, and several other firms in high-technology fields and may go as high as 7 percent by 1986. Local manufacturers are also aided in their development by the Ministry of Trade and Industry, which restricted purchases of foreign-made electronic goods. Permission is granted for imports of industrial products and high-tech products not produced locally, and for the spare parts needed by foreign-owned firms. The government also encourages inflows of foreign capital by easing restrictions on foreign investments and promoting joint ventures as the fastest way to achieve high technology levels. Although outnumbered by domestic electronics firms, joint ventures and foreign subsidiaries are already responsible for the bulk of production and exports.

Rising local demand strongly supports expansion of the production base. Domestic consumption of electronic consumer products grew from $568 million in 1982 to over $790 million in 1983, and industrial equipment sales rose from $420 million to $487 million in the same period.

Home entertainment products.—Home entertainment products firms, which started out as low-technology assembly operations, are now advancing to higher technology manufacturing systems but still depend on imports for many of their parts, raw materials, and industrial equipment. Well over 100 companies are active producers, but only 16 of them account for half the industry's production (see table 4).

Output centers on television sets, stereo receivers and other audio systems, and electronic watches. The Government regards color TV's, VTR's, audio systems, and video cameras as the industry's leading

Source: "Electronic Components in the Republic of Korea," Peat, Marwick, Mitchell & Co., Seoul, Korea, July 1985, prepared under contract to International Trade Administration, U.S. and Foreign Commercial Service (see Additional Information box).

Note: All values are given in U.S. dollars. Local currency is converted at the following exchange rates: US$1 = Won 681 (1981), Won 731 (1982), Won 798 (1983), Won 830 (1984), Won 880 (1985), and Won 900 (1988).

Table 1.—Korea: Total and merchant market for electronic components, 1981-88
(in millions of U.S. dollars)

	1981	1982	1983	1984	1985	Projected 1988
Active components						
Production	704	883	1,150	1,461	1,855	3,944
Imports	233	162	271	369	430	679
Exports (less)	504	631	830	1,080	1,404	3,024
Total	433	414	591	750	881	1,599
Merchant market (est.)	398	381	544	690	810	1,471
Passive components						
Production	389	401	617	783	995	2,116
Imports	275	259	331	414	517	1,010
Export (less)	174	155	201	261	340	732
Total	490	505	747	936	1,172	2,394
Merchant market (est.)	451	465	687	861	1,078	2,202
Total market						
Production	1,093	1,284	1,767	2,244	2,850	6,060
Imports	508	421	602	783	947	1,689
Exports (less)	678	786	1,031	1,341	1,744	3,756
Total	923	919	1,338	1,686	2,053	3,993
Merchant market (est.)	849	846	1,231	1,551	1,888	3,673

Note: "Total market" means all sales of electronic components, including those between affiliated companies and those intended for reexport. "Merchant market" means the open market sales of components between unrelated companies and excludes captive or intracompany sales.

Source: "Electronic Components in the Republic of Korea," prepared under contract for the International Trade Administration, U.S. and Foreign Commercial Service (see Additional Information box).

items for the future, while electronic watches and radios are expected to become less competitive on the world market.

Black and white television sets are attractively-priced compared with those from Taiwan, Hong Kong, and Singapore. Color TV's are improving in quality and durability but cannot yet compete with those from Japan and Taiwan on the basis of quality, image, and brand. In audio systems, Korean companies do well in stereo receivers, radios, and cassettes but lag behind Japanese producers in record players, speaker systems, and audio components. Korean-made electronic watches carry a higher price tag than those from Hong Kong and Singapore, but their quality also exceeds all other Asian-made watches except those from Japan. Future production is expected to include speech recognition multichannel, DBS, and CATV television sets, and camera-built-in compact VTR systems.

Computers.—The 40 domestic manufacturers of computers are anxious to make computers a leading export item. The present technological level is low, and production levels are still inadequate for profitable operations. Only 6 companies are able to make minicomputers, and the remainder, which manufacture micro or personal computers, copy foreign-made machines. Medium-sized computers are under development through cooperative efforts between major private companies and the electronic technical institutes. The Government is encouraging foreign investment in order to transfer technology from the advanced nations for the manufacture of large-scale computer systems. Foreign agencies now operating in Korea include IBM-Korea, Control Data Korea, and Fujitsu Korea.

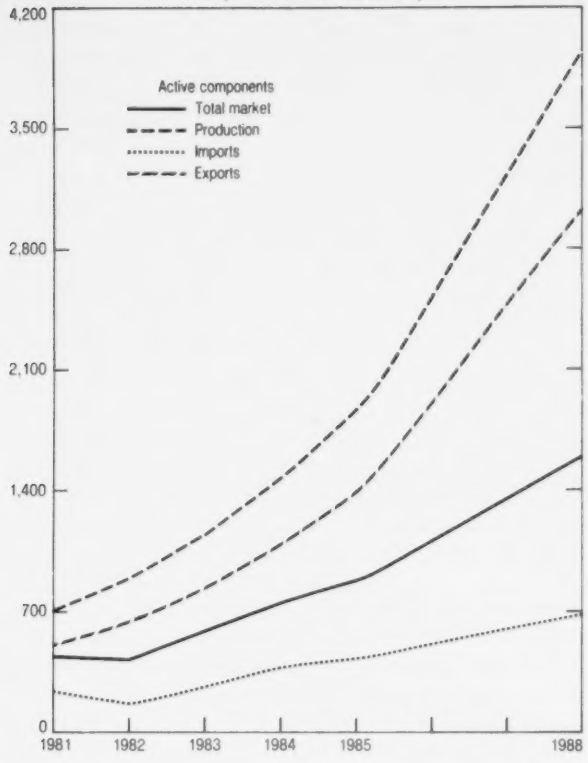
Both the government and private firms are rapidly increasing their research and development activities. Government programs include work on computer-aided design by the Electric-Technological Institute, as well as computer architecture and technology development programs, educational microcomputer development, CAD/CAM, and computer mechanization by the Korea Advanced Institute of Science and Technology. Privately-funded R&D includes development of 8-bit microcomputers by Gold Star, Samsung Electronics, and Daewoo Electronics; development of a 16-bit unit-based microcomputer by Korea Electronic Communication Corporation; and development of a medium-sized microcomputer operating system by Gold Star Semiconductor Co. Eventually, the industry hopes to improve their 32-bit processors.

Local firms currently make the following machines:

- Digital EES computer (Samsung Semiconductor & Telecommunications Co.)
- Honeywell level 6 minicomputer (Gold Star Semiconductor)
- CRT terminal printer and LSI-11/23 (Daewoo Electronics)
- Office computer (Hyosung-Hitachi Electronic Co.)
- CRT terminal and 8-bit minicomputer (Oriental Precision Co.)
- 8-bit and 16-bit computers (Jeail Chung Mill Co.)
- 8-bit microcomputer (Samsung Electronics Co.)
- Microcomputer (Oricom)

Figure 1
Korea: The market for electronic components, 1981-88

(In millions of U.S. dollars)



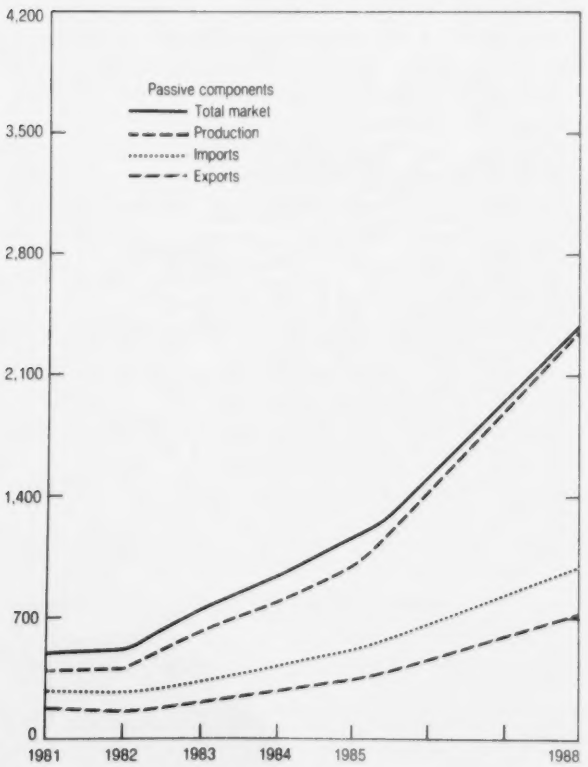


Table 2.—Korea: Sales of electronic components by selected subcategories, 1983 and 1988
(in millions of U.S. dollars)

	1983	Projected 1988
Discrete semiconductors		
Production	159.01	545
Imports	56.35	115
Exports (less)	127.10	465
Total	88.26	195
Merchant market (est.)	81.20	180
Optoelectronic devices		
Production	29.78	100
Imports	.72	5
Exports (less)	27.29	100
Total	3.21	5
Merchant market (est.)	.95	5
Integrated circuits		
Production	661.38	2,270
Imports	160.54	435
Exports (less)	658.05	2,395
Total	163.87	310
Merchant market (est.)	150.76	285
Electron tubes		
Production	300.27	1,030
Imports	53.46	125
Exports (less)	18.45	65
Total	335.28	1,090
Merchant market (est.)	308.46	1,000
Capacitors		
Production	134.47	460
Imports	24.90	90
Exports (less)	55.58	200
Total	103.79	350
Merchant market (est.)	95.49	320
Connectors		
Production	12.91	45
Imports	95.28	160
Exports (less)	6.63	25
Total	101.56	180
Merchant market (est.)	93.43	165
Filters, networks, and crystals		
Production	21.87	75
Imports	7.07	25
Exports (less)	12.97	45
Total	15.97	55
Merchant market (est.)	14.70	500
Magnetics		
Production	205.29	705
Imports	1.63	5
Exports (less)	.93	5
Total	205.99	705
Merchant market (est.)	189.51	650
Microwave hardware		
Production	5.18	20
Imports	44.93	30
Exports (less)	5.23	20
Total	44.88	30
Merchant market (est.)	41.29	30
Printed circuit boards		
Production	83.52	285
Imports	18.66	45
Exports (less)	6.12	25
Total	96.06	305
Merchant market (est.)	88.38	285

Table 2.—Korea: Sales of electronic components by selected subcategories, 1983 and 1988 (Continued)
(in millions of U.S. dollars)

	1983	Projected 1988
Other passive components		
Production	154.07	530
Imports	138.79	655
Exports (less)	113.64	415
Total	179.22	770
Merchant market (est.)	164.89	705

Sources: Korean Statistical Yearbook of Foreign Trade (1983), Statistical Electronic Electric Industries (1983), and International Trade Administration research report.

Communications equipment.—Although the technological level of Korean-made communications equipment is quite low and still unattractive to foreign end users, local companies provided about 42 percent of domestic communications equipment in 1982. The government is encouraging the industry to modernize and expand its production to supply 60 percent of the nation's needs by 1986. It plans to install economical and reliable ESS-2-style equipment in the telecommunications network, as well as pulse code modulation modems.

Carrier equipment manufacturers include Daewoo Telecom, Gold Star Electric, and Samsung Precision. Oriental Precision, Daeyoung Electronic, and Samsung Precision are radio communications equipment makers. Telephone manufacturers include Gold Star Tele-electric and Samsung Semiconductor.

Current production includes SDM telephone exchanges, electronic switching systems, and test-level short wave optic telecom systems. Future production is expected to move to TDM electronic switching systems and long-wave optic telecom systems.

Competitive Assessment

Because of their high prices, domestic manufacturing hesitate to use foreign-made components unless similar items cannot be obtained locally. In 1984, overseas purchases supplied 46 percent of the country's needs; by 1988, the share is expected to decline to 42 percent.

Domestic suppliers.—More than 1,000 firms produce electronic components domestically, many of them subsidiaries or joint ventures with foreign manufacturers (see list of Leading Suppliers). The industry is dominated by the Big Three—Gold Star, Samsung Electronics, and Daewoo Electronics—which purchase basic parts from small and medium-sized manufacturers, many of them subsidiary companies. Component quality is not yet comparable to that of foreign-made components, but prices are very competitive.

Production, which more than doubled between 1981 and 1984, is predicted to continue climbing rapidly to 1988 in every component field as production technology increases. The Lucky-Gold Star Group, one of the country's most formidable conglomerates, has been a leader in the drive to bring in high-technology know-how. It obtains access to sophisticated products through associations with foreign firms and has already formed 21 joint ventures and technological agreements with overseas companies. One agreement is with Dow Corning to manufacture silicone, and another major venture is with AT&T to produce fiber optics. AT&T has agreed to construct two production plants in Korea at a total cost of about $160 million. In a similar but more daring move, Samsung Semiconductor & Telecommunications Company is now manufacturing and exporting the commercially advanced 256 KD RAM memory chip under license from Micron Technology (United States).

Exports, which absorb most local production, center largely on discrete semiconductors and integrated circuits (see table 5). U.S. buyers receive the major portion of exported active components, while passives shipments are largely bound for Japan, the United States, and Western European countries (magnetics).

Third-country suppliers.—Japanese companies, with 41 percent of 1984 imports, clearly dominate overseas purchases in several categories, including discrete semiconductors, integrated circuits, electron tubes, capacitors, connectors, filters, magnetics, and printed circuit boards (see table 6). They offer high-quality products at competitive prices, provide excellent aftersales service, and benefit from proximity as well as cultural and language advantages. In addition, they have carefully cultivated the Korean market, even though it is still relatively small, by establishing numerous sales agencies.

Table 3.—Korea: Purchases of electronic components by end-user sector, 1983 and 1988
(in millions of U.S. dollars)

	1983	Projected 1988
Active components		
Home entertainment	207	560
Communications equipment	148	400
Computers and business systems	148	400
Others	88	239
Total	591	1,599
Passive components		
Home entertainment	261	838
Communications equipment	187	599
Computers and business systems	187	599
Others	112	358
Total	747	2,394

Sources: Statistics Electronic Electric Industries (1983) and International Trade Association research report.

Figure 2
Korea: Purchases of electronic components by end-user sector, 1983 and 1988

(in millions of U.S. dollars)

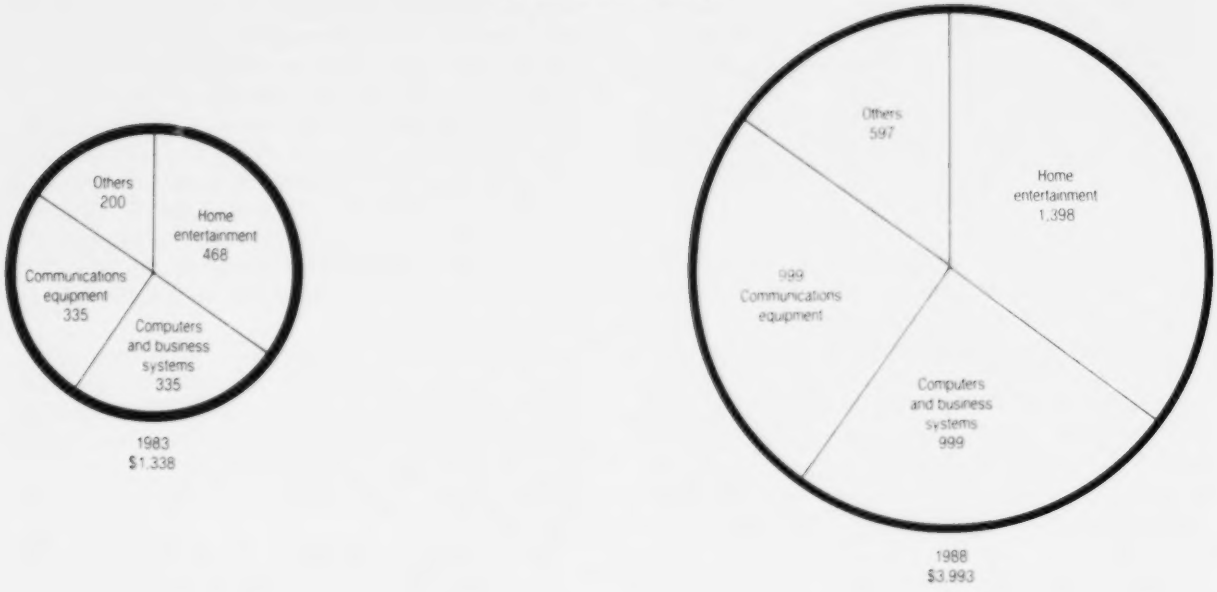


Table 4.—Korea: End-user sector economic indicators, 1983

	No. of firms	No. of firms accounting for 50% production	No. of firms accounting for 80% production	Production value (in millions of U.S. dollars)	Capital expenditures
Home entertainment	115	16	47	2,189	180
Communications equipment	96	10	28	852	150
Computers and business systems	93	9	26	91	70

Sources: Statistics Electronic Industries (1983), Electronics Industry Today and Tomorrow (1984), and International Trade Administration research report.

U.S. suppliers.—U.S. suppliers, which account for about 9 percent of imported electronic components, have a reputation for high-quality, advanced products that are practical and durable. They have a strong position in the industrial electronic goods field and are a major source of imported optoelectronic devices and microwave hardware. The most promising areas for future sales are those areas in which local firms are not very active (see Best Sales Prospects).

The Americans can improve their import position by more competitive pricing, improved aftersales service, and shortened delivery times. They need to educate end users about their products through quality advertising and through local agents who can also provide aftersales service. Aggressive commission sales agents are the most important link between suppliers and Korean end users; about 1,950 such agents are registered with the Ministry of Trade and Industry.

Reexports are common, with both local enterprises and foreign subsidiaries engaging in the reexport trade. Among the foreign subsidiaries are Motorola

Best Sales Prospects

Product	Prospective purchasers
Active components	
Monolithic IC's	Color television manufacturers
5" color braun tubes	
High-voltage diodes	Microwave oven manufacturers
IC's	
Passive components	
Tantalum capacitors	Color television manufacturers
Saw filters	
Relays	VTR manufacturers
Trimmer capacitors	
Fuses (buss ceramic tube)	Microwave oven manufacturers
Relays (JC type)	
Multi PCBs	Computer manufacturers
Keyboards (capacitors type)	
IC sockets and connectors	

Table 5.—Korea: Exports of selected electronic components by country, 1983-88
(in millions of U.S. dollars)

	1983	1984	Projected 1988
Discrete semiconductors			
United States	65.35	84.96	
Hong Kong	22.31	29.01	
Japan	19.55	25.41	
France	14.92	19.40	
Taiwan	1.51	1.96	
Other	3.46	4.50	
Total	127.10	165.24	465
Optoelectronic devices			
United States	13.20	17.16	
Japan	9.44	12.28	
Hong Kong	1.63	2.12	
United Kingdom	.91	1.18	
Italy	.60	.78	
Other	1.50	1.96	
Total	27.28	35.48	100
Integrated circuits			
United States	450.26	585.34	
Hong Kong	86.43	112.36	
Japan	41.03	53.34	
Germany	39.06	50.78	
Singapore	13.53	17.59	
Other	27.73	36.05	
Total	658.04	855.46	2,395
Electron tubes			
Hong Kong	4.95	6.44	
India	1.87	2.41	
Iran	1.43	1.86	
Indonesia	1.41	1.84	
France	1.12	1.45	
Other	7.66	9.99	
Total	18.44	23.99	65
Capacitors			
United States	6.05	7.87	
Japan	26.75	34.77	
Hong Kong	7.10	9.23	
Netherlands	4.38	5.69	
Singapore	2.84	3.69	
Other	8.46	11.00	
Total	55.58	72.25	200
Connectors			
United States	2.45	3.18	
Japan	2.24	2.92	
Hong Kong	.79	1.02	
Singapore	.57	.74	
United Kingdom	.28	.37	
Other	.30	.40	
Total	6.63	8.63	25
Filters, networks, and crystals			
United States	4.86	6.32	
Japan	3.55	4.62	
Hong Kong	1.58	2.06	
United Kingdom	.71	.92	
Other	2.27	2.95	
Total	12.97	16.87	45
Magnetics			
United States	.49	.63	
Japan	.40	.52	
Hong Kong	.01	.01	
Germany	.01	.01	
Other	.03	.04	
Total	.94	1.21	5
Microwave hardware			
United States	1.06	1.38	
United Kingdom	2.33	3.03	
Netherlands	1.60	2.08	
Canada	.10	.13	
Australia	.09	.11	
Other	.05	.07	
Total	5.23	6.80	20
Printed circuit boards			
United States	4.32	5.61	
Hong Kong	.62	.80	
Japan	.41	.54	
United Kingdom	.27	.35	
Germany	.15	.19	
Other	.36	.47	
Total	6.13	7.96	20
Other passive components	113.64	147.73	415

Sources: Korean Statistical Yearbook of Foreign Trade (1983, 1984) and International Trade Administration research report.

Table 6.—Korea: Total and merchant imports of selected electronic components by country, 1983-88
(in thousands of U.S. dollars)

	1983	1984	Projected 1988
Discrete semiconductors			
United States	5,671	7,864	14,470
Japan	35,290	36,814	
China	5,248	5,290	
Singapore	2,418	2,499	
Hong Kong	1,327	2,137	
Other	6,397	7,816	
Total	56,351	62,420	114,852
Merchant imports (est.)	51,843	57,426	105,644
Optoelectronic devices			
United States	273	352	648
Japan	384	586	
Hong Kong	13	10	
China	19	2	
Other	31	38	
Total	720	988	1,818
Merchant imports (est.)	662	908	1,673

Table 6.—Korea: Total and merchant imports of selected electronic components by country, 1983-88 (continued)
(in thousands of U.S. dollars)

	1983	1984	Projected 1988
Integrated circuits			
United States	26,052	43,029	79,173
Japan	85,960	128,946	
Hong Kong	9,182	11,916	
Singapore	5,441	9,115	
China	5,724	7,396	
Other	28,177	36,892	
Total	160,536	237,294	436,621
Merchant imports (est.)	147,693	218,310	401,691
Electron tubes			
United States	2,351	1,396	2,569
Japan	47,608	52,408	
China	1,981	11,290	
United Kingdom	341	144	
Netherlands	241	54	
Other	936	3,061	
Total	53,458	68,353	125,770
Merchant imports (est.)	49,181	62,885	115,708
Capacitors			
United States	2,541	4,119	10,050
Japan	20,103	28,794	
Germany	617	991	
China	562	772	
United Kingdom	220	228	
Other	854	2,414	
Total	24,897	37,318	91,056
Merchant imports (est.)	22,905	34,332	83,772
Connectors			
United States	20,598	9,231	22,524
Japan	59,454	42,388	
Germany	2,327	3,622	
United Kingdom	1,958	1,030	
Singapore	1,564	192	
Other	9,378	8,323	
Total	95,279	64,786	158,078
Merchant imports (est.)	87,657	59,603	145,432
Filters, networks, and crystals			
United States	85	200	488
Japan	6,883	9,922	
Hong Kong	45	351	
China	25	153	
Other	32	133	
Total	7,070	10,759	26,252
Merchant imports (est.)	6,504	9,898	24,152
Magnetics			
United States	79	234	571
Japan	1,472	1,459	
China	60	52	
Singapore	9	—	
Other	13	14	
Total	1,633	1,759	4,292
Merchant imports (est.)	1,502	1,618	3,949
Microwave hardware			
United States	30,107	3,198	7,803
Japan	3,169	4,425	
Netherlands	8,079	1,386	
Germany	1,941	1,258	
Other	1,633	2,885	
Total	44,929	13,152	32,091
Merchant imports (est.)	41,335	12,100	29,524
Printed circuit boards			
United States	4,727	2,803	6,839
Japan	10,246	12,063	
Hong Kong	1,468	1,132	
Germany	467	325	
Canada	268	183	
Other	1,483	2,404	
Total	18,659	18,910	46,140
Merchant imports (est.)	17,166	17,397	42,450
Other passive components			
Total	138,790	267,387	652,424
Merchant imports (est.)	127,687	245,996	600,230

Sources: Korean Statistical Yearbook of Foreign Trade (1983, 1984) and International Trade Administration research report.

Korea, Signetics Korea, and Tele-Video Korea. Motorola Korea, which produces semiconductors and communications products, reexport 90 percent of the semiconductors and all of the communications products made with imported components. Reexports are expected to remain strong, since the recently passed Foreign Capital Inducement Act encourages inflows of advanced foreign technology as well as foreign capital.

Business Practices

Imported electronic components are distributed either directly from the supplier to the end user or from the supplier through commission sales agents and registered traders to the end user. Registered traders handle the documentation for all imported merchandise transactions, since by law they make up the only group authorized to import goods in their own names (with the exception of goods entering the country in connection with foreign investment projects). Some end users are also registered traders; others pay a small fee to registered traders to handle the import function.

Factory operators are very price-conscious on standard, off-the-shelf items. Payment terms are not a critical purchase factor, since sales agents or end users operate on irrevocable sight letters of credit.

Import licenses are required, but, under the system of licensing introduced in July 1967, license applications for all commodities are approved automatically unless the item is included on a list of restricted or prohibited items. These restrictions (see table 7), issued annually by the Ministry of Trade and Industry as the Annual Trade Plan, become effective on July 1 of each year. According to Korea's electronics regulations, electronics goods produced by a joint venture can be sold freely in the domestic market. Subsidiaries can sell up to 50 percent of their total production in the local market. Imported electronic components carry a general tariff rate of 30 percent and a preferential rate of 22.5 percent, which applies to components from the United States and 83 other countries.

Table 7.—Korea: Requirements for Importing Under Annual Trade Plan (1984-85)

CCN	Description	Restrictive Measures
8518	Electrical capacitors, fixed or variable	
0101	Electrolytic capacitors, fixed	1. The following are automatic approval items: Those covered with paper. 2. Others are subject to recommendation of the Electronic Industries Association of Korea.
0102	ceramic capacitors, fixed	Subject to recommendation of the Electronic Industries Association of Korea.
0199	Other fixed capacitors (excluding electrolytic capacitors and ceramic capacitors)	1. The following are automatic approval items: Capacitors for electric power. 2. Others are subject to recommendation of the Electronic Industries Association of Korea.
0201	Variable polyethylene capacitors	Subject to recommendation of the Electronic Industries Association of Korea.
8519	Electrical apparatus for making and breaking electrical circuits, for the protection of electrical circuits, or for making connections to or in electrical circuits (for example, switches, relays, fuses, lightning arresters, surge suppressors plugs, lamp holders, and junction boxes); resistors, fixed or variable (including potentiometers), other than geating resistors; printed circuits; switchboards (other than telephone switchboards) and control panels	
0100	Relays	1. The following are subject to recommendation of the Korea Electrical Manufacturers Cooperative: Protection relays for transmission, supply and transform of electricity (including subrelays). 2. The following are subject to recommendation of the Korea Auto Industries Association: Those for automobile with voltage required of 6V to 24V. 3. The following are subject to recommendation of the Electronic Industries Association of Korea: Those for electronic apparatus. 4. Others are automatic approval items.
0301	Connectors	Subject to recommendation of the Electronic Industries Association of Korea.
0304	Sockets	1. The following are automatic approval items: a. Those of explosion-proof types. b. Those for home. 2. Others are subject to recommendation of the Electronic Industries Association of Korea.
0501	Circuit breakers, of power required not less than 22KV	1. The following are subject to recommendation of the Korea Electrical Manufacturers Cooperative: a. Gas circuit breaker, of not more than 369KV. b. Oil circuit breaker, of not more than 171KV. c. Vacuum circuit breaker of not more than 25KV. 2. Others are automatic approval items.
0502	Switches, of power required not less than 22KV	1. The following are subject to recommendation of the Korea Electrical Manufacturers Cooperative: Switches, of not more than 30KV. 2. Others are automatic approval items.
0599	Electrical apparatus for making and breaking, for protecting, or for making connections to or in electrical circuits, not falling within any other subheading of this heading (those of power required not less than 22KV)	1. The following are prohibited items: Clamps, connectors and sleeves of aluminum fittings for circuits. 2. Others are automatic approval items.
0601	Circuit breakers, of power required less than 22KV	1. The following are subject to recommendations of the Korea Electrical Manufacturers Cooperative: a. Breakers of wiring, of not more than 600V.

Table 7.—Korea: Requirements for Importing Under Annual Trade Plan (1984-85) (continued)

CCN	Description	Restrictive Measures
		b. Breakers for electric leakage. c. Gas circuit breaker and oil circuit breaker. d. Vacuum circuit breaker, of not less than 3.3KV. 2. Others are automatic approval items.
0602	Switches, of power required less than 22KV	1. The following are subject to recommendation of the Korea Electrical Manufacturers Cooperative (however, those for electronic industries are subject to recommendation of the Electronic Industries Association of Korea): Those with voltage not more than 30KV (however, those of explosion-proof types and tumbler switches for home are automatic approval items. 2. The following are subject to recommendation of the Korea Auto Industries Association: Those for automobile with a voltage required of not less than 6V but not more than 24V 3. Others are automatic approval items.
0699	Electrical apparatus for making and breaking, for protecting, or for making connections to or in electrical circuits, not falling within any other subheading of this heading (those of power required less than 22KV)	1. The following are subject to recommendation of the Korea Auto Industries Association: Contact point sets for switchboard of internal combustion engine. 2. Others are automatic approval items.
0799	Others parts of electrical apparatus for making and breaking, for protecting, or for making connections to or in electrical circuits	1. The following are subject to recommendation of the Korea Auto Industries Association: Parts of contact point sets for switchboard of internal combustion engine. 2. Others are automatic approval items.
0801	Printed circuits	
0901	Volume controllers with switches	
0902	Volume controllers other than those with switches	
0999	Other variable resistors	Subject to recommendation of the Electronic Industries Association of Korea.
1001	Fixed resistors of carbon film	
1002	Fixed resistors of metal film	
1099	Other fixed resistors	
1201	Switchboards	1. The following are automatic approval items: a. Those of explosion-proof type b. Those for vessels 2. Others are subject to recommendation of the Korea Electrical Manufacturers Cooperative.
1203	Automatic control panels	
1299	Other control panels	
8520	Electric filament lamps and electric discharge lamps (including infrared and ultraviolet lamps): arc-lamps	
0199	Filament lamps other than infrared or ultraviolet lamps, except those for decorations and for attracting fish	1. The following are subject to recommendation of the Korea Auto Industries Association: Bulbs for automobile headlights with a voltage required of not less than 6V but not more than 24V. 2. Others are automatic approval items.
8521	Thermionic, cold cathode, and photocathode valves and tubes (including vapor or gas-filled valves and tubes, cathode-ray tubes, television camera tubes and mercury are rectifying valves and tubes); photocells; mounted piezoelectric crystals; diodes, transistors, and similar semiconductor devices; electronic microcircuits	
0101	Cathoderay color television picture tube	Subject to recommendation of the Electronic Industries Association of Korea.
0207	Magnetron	
0300	Photo-cathode tube	
0401	Silicon transistors	
0499	Transistors other than those of silicon	
0299	Other thermionic or cold cathode	1. The following are subject to recommendation of the Electronic Industries Association of Korea Display tube for cash resistor.

Table 7.—Korea: Requirements for Importing Under Annual Trade Plan (1984-85) (continued)

CCN	Description	Restrictive Measures
0501	Silicon diodes	1. The following are automatic approval items: Those for automobile.
0599	Other diodes	2. Others are subject to recommendation of the Electronic Industries Association of Korea.
0600	Elements of rectifiers	Subject to recommendation of the Electronic Industries Association of Korea.
0999	Other electronic microcircuits	1. The following are automatic approval items: a. Peripheral interface adapter. b. Input/output interface. c. A/D or D/A converter. 2. Others are subject to recommendation of the Electronic Industries Association of Korea.
1000	Mounted piezo-electric	1. The following are automatic approval items: Those for making electronic lighters. 2. Others are subject to recommendation of the Electronic Industries Association of Korea.
1101	Parts of cathode-ray television picture tubes	
1301	Parts of transistors	
1302	Parts of diodes	
1304	Lead frames for making semiconductor	Subject to recommendation of the Electronic Industries Association of Korea.
1400	Parts of electronic microcircuits	
1600	Light emitting diodes	
0801	Thyristers	
0899	Other semiconductor devices	
0901	Large-scale integrated circuits	1. The following are subject to recommendation of the Electronic Industries Association of Korea: a. Microprocessor. b. Random access memory. c. Read-only memory. 2. Others are automatic approval items.
0902	Very large scale integrated circuits	

Source: International Trade Administration research report.

List of Leading Suppliers

Company	Foreign Affiliate and/or Country of Manufacture	Products
Active Components		
Domestic suppliers:		
Afcoa Korea Co., Ltd.	Subsidiary	Hybrid I.C.
Anam Industrial Co., Ltd.	Joint venture (Japan)	All kinds of semiconductors
Daewoo Telecom Co., Ltd.		Semiconductors
Doshin Precision Co., Ltd.		Hybrid I.C.
Dong Yang Picture Tube Ind. Co., Ltd.	Joint venture	B/W cathode ray tube
Gold Star Semiconductor Ltd.		
Hyundai Electronics Industries Co., Ltd.		ROMs, RAMs
Komy Semiconductor, Ltd.	Joint venture (United States)	Silicon transistor I.C.
Korea Electronics Co., Ltd.	Joint venture (Japan)	Silicon transistor I.C., didodes
Korean Microsystems, Inc.	Subsidia. y	MOS, LSI
Korea Optoelectronic Co.		Diodes, LED LAMPs
Korea Sanken Co., Ltd.	Subsidiary	LED
Korea Tokyo Silicon Co., Ltd.	Subsidiary (Japan)	Silicon transistor, Hybrid I.C.
Motorola Korea Ltd.	Subsidiary (United States)	I.C. transistor
Orion Electronic Co., Ltd.	Joint venture	Color picture tube, B/W picture tube, data display tube
Rohm Korea Corp.	Joint venture (United States)	Silicon transistor array, silicon diode array, LED display
Samsung Corning Co., Ltd.	Joint venture (United States)	B/W and color picture tube
Samsung Electron Tube Co., Ltd.	R & D	
Samsung Semiconductor & Telecommunications Co. Ltd.	R & D	Semiconductor
Foreign suppliers:		
Advanced Semiconductors Co.	United States	Germanium & silicon transistors, fast recovery diode
Burndy Electronic Co.	Belgium, Japan, United States	Substrate terminal for hybrid IC
Crimson Semiconductor Co.	United States	Discreet semiconductors, electron tube

List of Leading Suppliers—Continued

Company	Foreign Affiliate and/or Country of Manufacture	Products
Fairchild Electronic Co.	Hong Kong	Bipolar IC, diode
Fujitsu Electronic Co.	Japan	Lager diodes
Hitachi Semiconductor Co.	Hong Kong	Color display tube, transistor diode, IC
Murata Electronic Co.	Japan	Ceramic condenser, electronic watch & clock IC
National Semiconductor Co.	United States	Bipolar Digital IC, C-Mos IC hybrid IC, Logic IC, LSI, Mos IC
Nippon Electric Co.	Japan	Electron tube
Power Semiconductor Co.	Switzerland	Darlington transistors, customer-design semiconductors
RCA	United States	Diode, C-Mos IC, IC linear IC, LSI, Memory IC, Q-Mos IC, semiconductor, transistor
Toshiba Electronic Co.	Japan	Calculator IC, C-Mos IC, electronic IC, diode, electronic watch & clock IC, G-TR Phi Mos TR, linear IC, memory IC
Westinghouse Electric Co.	United States	Electric lamp, power semiconductor
Passive Components		
Domestic suppliers:		
Abco Co., Ltd.	Joint venture (Japan)	Resistors
Daewoo Electronic Components Co., Ltd.	Joint venture	Capacitors
Daisung Electronic Industries Co., Ltd.		Coils
Doshin Precision Co., Ltd.		Resistors
Dong Kuk Electronics Industries Co., Ltd.		Polyester film capacitors, ceramic trimmer capacitors, semi fixed resistors, electrolytic capacitors
Gold Star Alps Electronics Co., Ltd.		Switch, resistors, capacitors
Han Ryuk Electronics Co., Ltd.	Joint venture (Japan)	Resistors
Hung Chang Products Co., Ltd.		Variable resistors, semi fixed resistors
Ilshin Communication Co., Ltd.		Crystal unit, crystal filter
Jung Poong Products Co., Ltd.		Switch, variable resistors
Kony Precision Co., Ltd.		Crystal unit
Kwang Sung Electronics Co., Ltd.		Semi fixed resistors
Philips Electronics (Korea), Ltd.	Subsidiary (Netherlands)	Carbon film resistors standard film
Rohm Korea Corp.	Joint venture (United States)	Fixed metal film resistor, fixed carbon film resistor
Sangsung Electronic Parts Co., Ltd.		Key board
Seolin Electronics Co., Ltd.		Carbon film fixed resistor, metal film fixed resistor
Sunny Emz Co., Ltd.		Crystal unit, crystal filter
Foreign suppliers:		
AT&T Co.	United States	Connector, flat type resistors
Alps Electric Co.	Japan	Switch
Burndy Electric Co.	Belgium, Japan, United States	Cable connector, cam switch, card edge connector, circular connector, durocard connector
Emerson Beckman Ind.	United States	Dip switch
Hokuriku Electronic Ind.	Japan	Printed resistor circuits, thick film resistor networks, variable resistors
Lemosa Electronic Co.	Switzerland	Precision round connector
Maruta Electronic Co.	Japan	Semi fixed resistor, ceramic condenser, ceramic filter, filter
Matsushita Electronic Co.	Japan	E.E. switch, limit switch, magnetic, VC relay, micro switch, Reed switch
Newport Int'l Co.	United States	Electronic circuits board
Sanyo Electronic Co.	Japan	Anode solid electronic capacitor
Toho Trading Co.	Japan	Trimmer capacitor, variable capacitor

Korea: Basic Economic Indicators

Population:	41.176 million (1985)	Imports c.i.f.:	29.4 billion (1985)
GNP:	82,391 million (1985)	U.S. share:	24%
Contributions to GDP:	Services 45% (1982)	Major trading partners:	Japan, United States
	Industry 39%	Exchange rate:	891.7 won = US$1 (1985)
	Agriculture 16%	Fiscal year:	Calendar year
Average annual growth rates:	Services 7.8% (1982)	Current account balance:	–$800 million (1985)
	Industry 13.6%	International reserves:	$7,750 million (1985)
	Agriculture 2.9%	Labor force:	15.4 million (1985)
Per capita income:	2,001 (1985)	Average daily wage:	$1.59 (1985)
Inflation rate:	5.0% (1985)		
Exports f.o.b.:	28.5 billion (1985)		
U.S. share:	33%		

Useful Addresses

Embassies

American Embassy
Commercial Section
82 Sejong-Ro
Chongro-ku
Seoul
tf: 722 26 01
tx: amemb 23108

Embassy of Korea
2370 Massachusetts Avenue, N.W.
Washington, DC 20008
tf: 483-7383

American Chamber of Commerce

American Chamber of Commerce in Korea
Chosun Hotel, Rm. 307
87 Sokong-dong
Chung-ku
Seoul
tf: 752 3061
tx: k28432

Electronics trade associations

Electronic Industries Association of Korea
648 Yoksam-dong
Kangnam-gu
Seoul
tf: 553-0941
tx: KTANEWS K24208

Korean Electrical Manufacturers Cooperative
14-6 Tongja-dong
Yongsam-gu
Seoul
tf: 754 5837

Licensing agency

Ministry of Trade and Industry
77-6 Sejong-ro
Chongno-gu
Seoul
tf: 722 26 71

Technical standards

Bureau of Standards
Industrial Advancement Administration
2, Chong-ang-dong
Kwaoh'on-rnyon
Kyonggi-do 171-11
Seoul
tf: 590 85 28
tg: doriaa
tx: 28456 fincen k

Additional Information

The project officer responsible for Country Market Surveys on electronic components is:

Hayden M. Wetzel
ITA/EPS, Room H2012
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-4493

Current information on marketing conditions in Korea is available from:

Republic of Korea Desk Officer
ITA/IEP, Room H2034
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-4399

Department sponsored trade shows and other promotional vehicles for electronic components are handled by:

Joseph Burke
ITA/TD, Room H4412
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-5014

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Washington, DC 20044
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